

# APPENDIX B: 2006

revised 8/15/2006

Appendix B shows the linkages of all the inputs and outputs from various technical sections of the MYPP to one another. These inputs and outputs are also reported in the R&D Milestone Charts at the end of each technical section. The task numbers reported in Appendix B are those from the associated R&D Milestone Chart

Output From	#	Title	Quarter	FY	Task	Task	Task	Task	Task	Task	Task	Task	Task	Task	Task
Production	P1	Hydrogen production technology for distributed systems using natural gas with projected cost of \$3.00/kg hydrogen at the pump, untaxed, assuming 500 manufactured units per year.	3	2006	1				8			2,3			
Production	P2	Assessment of fuel contaminant composition.	4	2006	1,2,3,4,5		4,5	12	9						
Production	P3	Impact of hydrogen quality on cost and performance.	3	2007	1,2,3									6	5
Production	P4	Hydrogen production technology for distributed systems using natural gas with projected cost of \$2.50/kg hydrogen at the pump, untaxed, assuming 500 manufactured units per year.	4	2007	1							2,3			
Production	P5	Impact of hydrogen quality on cost and performance.	4	2009	1,2,3									6	5
Production	P6	Assessment of fuel contaminant composition.	4	2009	2,3,4,5		4,5	12	9						
Production	P7	Hydrogen production technologies for distributed systems using natural gas with projected cost of \$2.50/kg hydrogen at the pump, untaxed, assuming 500 manufactured units per year.	4	2010	1				8			2,3			
Production	P8	Down-select of high-temperature electrolysis technology based on research results.	2	2007	3							5			
Production	P9	Electrolysis system making hydrogen for \$2.85/kg delivered.	4	2010	3							2,5			
Production	P10	Hydrogen production system making hydrogen for \$1.90/kg from biomass at the plant gate.	4	2009	5							5			
Delivery	D1	Assessment of cost and performance requirements for off-board storage systems.	4	2006	1			12						6	2
Delivery	D2	Hydrogen contaminant composition and issues.	4	2006	1,2,3,4,5,6			12							

						Production	Delivery	Storage	Fuel Cells	Safety	Codes & Stds	Tech Valid'n	Education	Systems Analysis	Systems Integ'tion
Output From	#	Title	Quarter	FY	Task	Task	Task	Task	Task	Task	Task	Task	Task	Task	Task
Delivery	D3	Hydrogen delivery infrastructure analysis results.	4	2006	1							6		6	3
Delivery	D4	Assessment of impact of hydrogen quality requirements on cost and performance of hydrogen delivery.	3	2007	2,3,4,5,6									6	3
Delivery	D5	Compression technology recommended for validation.	2	2009	2							2,3			
Delivery	D6	Update of hydrogen quality requirements.	4	2009	2,3,4,5,6									6	5
Delivery	D7	Recommended liquefaction technology for potential validation.	2	2009	3							2,3			
Delivery	D8	Recommended pipeline technology for validation.	2	2009	4							2			
Delivery	D9	Off-board storage technology.	2	2009	6			12				2,3			
Storage	St1	Report on compressed and cryogenic liquid storage tanks and evaluation against 1.5 kWh/kg and 1.2 kWh/L.	4	2006	1							1			
Storage	St2	Report on advanced compressed/cryogenic tank technologies.	4	2009	2							1			
Storage	St3	Report on metal hydride system and evaluation against 2007 targets	2	2007	3				9			1,2			
Storage	St4	Report on full-cycle chemical hydrogen system and evaluation against 2010 targets.	1	2011	8		5,6		9			1			
Storage	St5	Baseline hydrogen on-board storage system analysis results including hydrogen quality needs and interface issues.	1	2007	12		6							6	2
Storage	St6	Final On-board hydrogen storage system analysis results of cost and performance; and down-select to a primary on-board storage system candidate.	1	2010	12		6							6	2
Fuel Cells	F1	Research results of advanced reformer development.	4	2007	8	1,2									
Fuel Cells	F2	Develop preliminary hydrogen quality requirements	2	2005	10										5
Fuel Cells	F3	Provide automotive stack test data from documented sources indicating durability status.	4	2006	10							1			
Fuel Cells	F4	Verify short-stack cold start (-20°C) to 50% of rated power in 60 seconds.	1	2008	10							1			

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						Production	Delivery	Storage	Fuel Cells	Safety	Codes & Stds	Tech Valid'n	Education	Systems Analysis	Systems Integ'tion
Output From	#	Title	Quarter	FY	Task	Task	Task	Task	Task	Task	Task	Task	Task	Task	Task
Tech Val	V14	Report on the status of validation of 5000 hour durability target and cold start capability	2	2016	1.3 & 2.5				9						4
Tech Val	V15	composite data products for infrastructure report	2	2016	1.3 & 2.5										
C&S	C1	Training modules for current practices.	2	2005	1								1,9		
C&S	C2	Training modules for amended practices for new technologies.	2	2006	1								1,9		
C&S	C3	Preliminary Assessment of Safety, Codes and Standards requirements for the hydrogen delivery infrastructure.	2	2005	4	1,2,3	1,2,3,4,5,6								
C&S	C4	Standards for compressed gaseous on-board storage.	4	2005	4			12							
C&S	C5	Completed hydrogen fuel quality standard as ISO Technical Specification.	3	2006	4	1,2,3	1,2,3,4,5,6	12	9			1,2		6	5
C&S	C6	Technical assessment of Standards requirements for metallic and composite bulk storage tanks.	3	2006	4		1,3,5,6	12				1,2			
C&S	C7	Final standards (balloting) for fuel dispensing systems (CSA America).	4	2006	4		2,5,6	12				1,2,3			
C&S	C8	Draft standards (balloting) for refueling stations (NFPA).	4	2006	4		1,2,5,6					2,3			
C&S	C9	Materials compatibility technical reference.	2	2008	4		4,6	12							
C&S	C10	Final draft standard (balloting) for portable fuel cells (UL).	4	2008	4				8						
C&S	C11	Codes and Standards for Delivery Infrastructure complete.	2	2010	4		2,3,4,5,6								
C&S	C12	Final Hydrogen fuel quality standard as ISO Standard.	2	2010	4	1,2,3,5	2,3,4,5,6	12	9			1,2		6	5
Safety	Sf1	Report of common accident scenarios.	3	2005	1								1,9		
Safety	Sf2	Updated report of common accident scenarios.	3	2007	1								1,9		
Safety	Sf3	Safety requirements and protocols for refueling.	2	2005	3	1,2,3	1,2,5,6	12				1,2			
Safety	Sf4	Safety requirements for onboard storage.	4	2005	3			12				1			
Safety	Sf5	Safety requirements and protocols for refueling.	2	2010	3	1,2,3	2,5,6	12				1,2			

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